

WHAT IS CLAIMED IS:

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1. An image processing apparatus for synthesizing a source image and a target image by positioning the target image in a designated synthesis area in the source image, comprising:

10 a search part searching coded data of the source image per predetermined independently processable block for an objective block corresponding to the designated synthesis area; and

an objective block synthesis part synthesizing  
15 detected coded data of the objective block of the source image and coded data of the objective block of the target image,

wherein the coded data are encoded in accordance with a JPEG 2000 standard.

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2. The image processing apparatus as claimed  
25 in claim 1, wherein the objective block synthesis part

comprises a coded data replacement part replacing the coded data of the objective block of the source image with the coded data of the objective block of the target image.

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3. The image processing apparatus as claimed  
10 in claim 1, further comprising:

an encoder encoding image data into coded data by performing two-dimensional wavelet transform, quantization and encoding on the image data in accordance with the JPEG 2000 standard; and

15 a decoder decoding the coded data into the image data by performing inverse two-dimensional wavelet transform, dequantization and decoding on the coded data in accordance with the JPEG 2000 standard.

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4. The image processing apparatus as claimed  
in claim 3, wherein the objective block synthesis part  
25 comprises:

an objective image reconstruction part using  
the decoding part to decode the coded data of the  
objective block of the source image into image data of  
the objective block of the source image and the coded  
5 data of the objective block of the target image into  
image data of the objective block of the target image;

an objective image synthesis part synthesizing  
the decoded image data of the objective block of the  
source image and the decoded image data of the objective  
10 block of the target image; and

an objective image re-encoding part using the  
encoding part to encode the synthesized image data of  
the objective block into synthesized coded data again  
and replacing the original coded data of the objective  
15 block of the source image with the synthesized coded  
data.

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5. The image processing apparatus as claimed  
in claim 3, wherein the objective block synthesis part  
comprises:

an objective wavelet coefficient  
25 reconstruction part using the decoding part to perform

the two-dimensional wavelet transform on the coded data  
of the objective block of the source image and the coded  
data of the objective block of the target image, thereby  
reconstructing a wavelet coefficient of the objective  
5 block of the source image and a wavelet coefficient of  
the objective block of the target image;

an objective wavelet coefficient synthesis  
part synthesizing the reconstructed wavelet coefficient  
of the objective block of the source image and the  
10 reconstructed wavelet coefficient of the objective block  
of the target image: and

an objective wavelet coefficient re-encoding  
part using the encoding part to encode the synthesized  
wavelet coefficient of the objective block into  
15 synthesized coded data again and replacing the original  
coded data of the objective block of the source image  
with the synthesized coded data.

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6. The image processing apparatus as claimed  
in claim 1, wherein the block comprises a tile having  
header information.

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7. The image processing apparatus as claimed  
5 in claim 1, wherein the block comprises a precinct.

10 8. The image processing apparatus as claimed  
in claim 1, wherein the block comprises a codeblock.

15 9. The image processing apparatus as claimed  
in claim 3, wherein the objective block synthesis part,  
when at least one of the source image and the target  
image is a color image, comprises a color image  
20 processing part providing weights to a luminance signal  
component and a color difference signal component of the  
source image so that a luminance signal component of a  
synthesized image has a smaller quantization step size  
than a color difference signal component thereof does.

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10. The image processing apparatus as claimed  
5 in claim 1, further comprising an output part outputting  
synthesized coded data to an exterior thereof.

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11. An image reading apparatus, comprising:  
a photoelectric conversion element reading an  
image and generating image data from the image;  
a coding part encoding the image data into  
15 coded data and decoding the coded data into the image  
data in accordance with a JPEG 2000 standard;  
a storage part maintaining coded data; and  
an image processing apparatus for synthesizing  
a source image and a target image by positioning the  
20 target image in a designated synthesis area in the  
source image, comprising: a search part searching coded  
data of the source image per predetermined independently  
processable block for an objective block corresponding  
to the designated synthesis area; and an objective block  
25 synthesis part synthesizing detected coded data of the

objective block of the source image and coded data of the objective block of the target image,

wherein the storage part maintains at least one of coded data encoded from the source image and  
5 coded data encoded from the target image.

10 12. An image forming apparatus, comprising:  
an image reading apparatus, comprising: a  
photoelectric conversion element reading an image and  
generating image data from the image; a coding part  
encoding the image data into coded data and decoding the  
15 coded data into the image data in accordance with a JPEG  
2000 standard; a storage part maintaining coded data;  
and an image processing apparatus for synthesizing a  
source image and a target image by positioning the  
target image in a designated synthesis area in the  
20 source image, comprising: a search part searching coded  
data of the source image per predetermined independently  
processable block for an objective block corresponding  
to the designated synthesis area; and an objective block  
synthesis part synthesizing detected coded data of the  
25 objective block of the source image and coded data of

the objective block of the target image, wherein the storage part maintains at least one of coded data encoded from a source image and coded data encoded from a target image; and

5           a printer engine forming an image on a paper based on image data decoded from output coded data of the image reading apparatus by the coding part.

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13. A computer-readable recording medium for storing a program to cause a computer of an image processing apparatus to execute a procedure of  
15       processing an image wherein the image processing apparatus is for synthesizing a source image and a target image by positioning the target image in a designated synthesis area in the source image, the procedure comprising:

20           a search function searching coded data of the source image per predetermined independently processable block for an objective block corresponding to the designated synthesis area; and

              an objective block synthesis function  
25       synthesizing detected coded data of the objective block



of the source image and coded data of the objective  
block of the target image,

wherein the coded data are encoded in  
accordance with a JPEG 2000 standard.

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14. The computer-readable recording medium as  
10 claimed in claim 13, wherein the objective block  
synthesis function comprises a coded data replacement  
function replacing the coded data of the objective block  
of the source image with the coded data of the objective  
block of the target image.

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15. The computer-readable recording medium as  
20 claimed in claim 13, the procedure further comprising:

an encoding function encoding image data into  
coded data by performing two-dimensional wavelet  
transform, quantization and encoding on the image data  
in accordance with the JPEG 2000 standard; and

25 a decoding function decoding the coded data

into the image data by performing inverse two-dimensional wavelet transform, dequantization and decoding on the coded data in accordance with the JPEG 2000 standard.

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16. The computer-readable recording medium as  
10 claimed in claim 15, wherein the objective block synthesis function comprises:

an objective image reconstruction function  
using the decoding function to decode the coded data of  
the objective block of the source image into image data  
15 of the objective block of the source image and the coded  
data of the objective block of the target image into  
image data of the objective block of the target image;

an objective image synthesis function  
synthesizing the decoded image data of the objective  
20 block of the source image and the decoded image data of  
the objective block of the target image; and

an objective image re-encoding function using  
the encoding function to encode the synthesized image  
data of the block into synthesized coded data again and  
25 replacing the coded data of the block of the source

image with the synthesized coded data.

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17. The computer-readable recording medium as claimed in claim 15, wherein the objective block synthesis function comprises:

an objective wavelet coefficient  
10 reconstruction function using the decoding function to perform the two-dimensional wavelet transform on the coded data of the objective block of the source image and the coded data of the objective block of the target image, thereby reconstructing a wavelet coefficient of  
15 the objective block of the source image and a wavelet coefficient of the objective block of the target image;

an objective wavelet coefficient synthesis  
function synthesizing the reconstructed wavelet  
coefficient of the objective block of the source image  
20 and the reconstructed wavelet coefficient of the objective block of the target image: and

an objective wavelet coefficient re-encoding  
function using the encoding function to encode the  
synthesized wavelet coefficient of the block into  
25 synthesized coded data again and replacing the coded

data of the block of the source image with the  
synthesized coded data.

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18. The computer-readable recording medium as  
claimed in claim 13, wherein the block comprises a tile  
having header information.

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19. The computer-readable recording medium as  
15 claimed in claim 13, wherein the block comprises a  
precinct.

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20. The computer-readable recording medium as  
claimed in claim 13, wherein the block comprises a  
codeblock.

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21. The computer-readable recording medium as claimed in claim 15, wherein the objective block  
5 synthesis function, when at least one of the source image and the target image is a color image, comprises a color image processing function providing weights to a luminance signal component and a color difference signal component of the source image so that a luminance signal  
10 component of a synthesized image has a smaller quantization step size than a color difference signal component thereof does.